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Jawaharlal Nehru

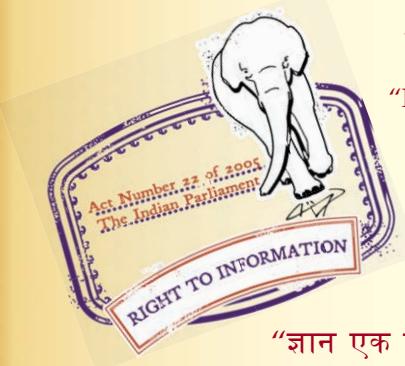
“Step Out From the Old to the New”

IS 10577 (1982): Lancing pipes [MTD 19: Steel Tubes, Pipes abd Fittings]

“ज्ञान से एक नये भारत का निर्माण”

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Bhartṛhari—Nītiśatakam

“Knowledge is such a treasure which cannot be stolen”



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Indian Standard
SPECIFICATION FOR
LANCING PIPES

UDC 621·643·2 : 669·141·24 : 669·187·243



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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR LANCING PIPES

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Indian Standard

SPECIFICATION FOR
LANCING PIPES

O. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 November 1982, after the draft finalized by the Steel Tubes, Pipes and Fittings Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This Indian Standard has been prepared to meet the requirements of lancing pipes used by steel industry.

0.3 Requirements for ceramic and other special coatings to enhance the life of the pipes will be added in due course after collecting the necessary data.

0.4 This standard contains clauses **2.4**, **11.1** and **12.1** which call for agreement between the purchaser and the manufacturer.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements of butt-welded, screwed and socketed and plain end mild steel pipes intended for use on oxygen lancing.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Black Pipe — Pipe as manufactured, but without any subsequent surface treatment.

*Rules for rounding off numerical values (*revised*).

2.2 Length of Screwed and Socketed Pipe — The length of the pipe inclusive of the socket.

NOTE 1 — The length of the pipe inclusive of the socket means the pipe length measured with socket fitted at one end to handling-tight.

NOTE 2 — Handling-tight means that the socket is so tight fitted that it should not fall down during handling or transit.

2.3 Nominal Bore — A size reference denoting the approximate bore of the pipe. For each size of pipe, the outside diameter is fixed by the corresponding screw thread dimensions of IS : 554-1975* and therefore, the actual bore of each size of pipe will vary according to the thickness.

2.4 Random Length — Normal manufacturing lengths which may vary over a range of several metres. Alternatively, a length range agreed to between the purchaser and the manufacturer.

2.5 Socket — The screwed coupling utilized in jointing the pipes together.

NOTE — The term 'socket' is synonymous with the term 'coupler'.

2.6 Pipe (Tube) — A long, hollow, open-ended object of circular or other cross-section. The term 'pipe' is synonymous with the term 'tube'.

3. DESIGNATION

3.1 Mild steel pipes covered by this standard shall be designated by their nominal bore, and shall be further classified as 'light', 'medium' and 'heavy' depending on the wall thickness.

3.2 Mild steel socket shall be designated by the respective nominal bore of the pipe for which it is intended.

4. SUPPLY OF MATERIAL

4.1 General requirements relating to the supply of mild steel pipes and sockets shall conform to IS : 1387-1967†.

4.2 Lancing pipes shall be supplied with any of the following combinations as specified by the consumer:

- Plain end, and
- Both ends screwed and one end socketed (*see also 10.2*).

5. MANUFACTURE

5.1 Pipes shall be manufactured from mild steel made by open hearth, electric or any of the oxygen processes.

*Dimensions for pipe threads where pressure-tight joints are required on the threads (*second revision*).

†General requirements for the supply of metallurgical materials (*first revision*).

5.2 Steel pipes and sockets shall be manufactured by one of the following processes:

- Continuous oxy-acetylene gas welded pipes (OAW),
- Electric resistance welded (ERW),
- High frequency induction welded (HFIW), and
- Hot-finished welded (HFW).

NOTE 1 — Pipes made by manual welding are not covered by this specification.

NOTE 2 — Hand welding of sockets may be permitted provided the test requirements for the sockets covered by the standard are complied with.

NOTE 3 — Sockets may also be manufactured from rods provided the test requirements for the sockets covered by the standard are complied with.

6. DIMENSIONS

6.1 The dimensions of pipes shall be in accordance with Tables 1, 2 and 3 subject to the tolerances permitted in **8**. Dimensions of sockets shall be in accordance with Table 4.

7. MASS

7.1 Nominal masses of 'light', 'medium' and 'heavy' black pipes shall be as specified in Tables 1, 2 and 3 respectively.

TABLE 1 DIMENSIONS AND NOMINAL MASSES OF BLACK STEEL PIPES (LIGHT)
(Clauses 6.1 and 7.1)

NOMINAL BORE	OUTSIDE DIAMETER		THICKNESS	MASS OF BLACK PIPE	
	Max	Min		Plain End	Screwed and Socketed
(1)	(2)	(3)	(4)	(5)	(6)
mm	mm	mm	mm	kg/m	kg/m
6	10·1	9·7	1·8	0·361	0·364
8	13·6	13·2	1·8	0·517	0·521
10	17·1	16·7	1·8	0·674	0·680
15	21·4	21·0	2·0	0·952	0·961
20	26·9	26·4	2·35	1·41	1·42
25	33·8	33·2	2·65	2·01	2·03

NOTE — Dimensions and masses are in accordance with ISO 65-1981*.

*Carbon steel tubes suitable for screwing in accordance with ISO 7/1.

TABLE 2 DIMENSIONS AND NOMINAL MASSES OF BLACK STEEL PIPES (MEDIUM)

(Clauses 6.1 and 7.1)

NOMINAL BORE	OUTSIDE DIAMETER		THICKNESS	MASS OF BLACK TUBE	
	Max	Min		Plain End	Screwed and Socketed
(1)	(2)	(3)	(4)	(5)	(6)
mm	mm	mm	mm	kg/m	kg/m
6	10·6	9·8	2·0	0·407	0·410
8	14·0	13·2	2·35	0·650	0·654
10	17·5	16·7	2·35	0·852	0·858
15	21·8	21·0	2·65	1·22	1·23
20	27·3	26·5	2·65	1·58	1·59
25	34·2	33·3	3·25	2·44	2·46

NOTE — Dimensions and masses are in accordance with ISO 65-1981*.

*Carbon steel tubes suitable for screwing in accordance with ISO 7/1.

TABLE 3 DIMENSIONS AND NOMINAL MASSES OF BLACK STEEL PIPES (HEAVY)

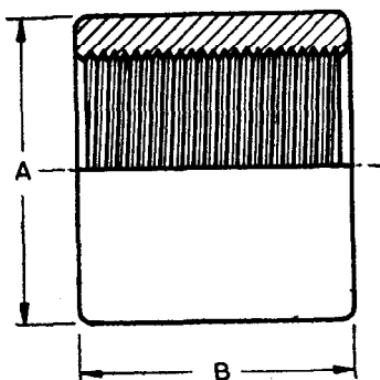
(Clauses 6.1 and 7.1)

NOMINAL BORE	OUTSIDE DIAMETER		THICKNESS	MASS OF BLACK TUBES	
	Max	Min		Plain End	Screwed and Socketed
(1)	(2)	(3)	(4)	(5)	(6)
mm	mm	mm	mm	kg/m	kg/m
6	10·6	9·8	2·65	0·493	0·496
8	14·0	13·2	2·9	0·769	0·773
10	17·5	16·7	2·9	1·02	1·03
15	21·8	21·0	3·25	1·45	1·46
20	27·3	26·5	3·25	1·90	1·91
25	34·2	33·3	4·05	2·97	2·99

NOTE — Dimensions and masses are in accordance with ISO 65-1981*.

*Carbon steel tubes suitable for screwing in accordance with ISO 7/1.

TABLE 4 DIMENSIONS OF SOCKETS
(Clause 6.1)



NOMINAL BORE	OUTSIDE DIAMETER, A Min	LENGTH, B Min
(1)	(2)	(3)
6	15	19
8	18	27
10	22	28
15	27	37
20	32.5	39
25	39.5	46

8. TOLERANCES ON THICKNESS AND MASS

8.1 The following manufacturing tolerances shall be permitted on the pipes and sockets:

1. *Thickness*

- | | |
|---------------------------|-------------------------------|
| a) Light pipes | + Not limited
- 8 percent |
| b) Medium and heavy pipes | + Not limited
- 10 percent |

2. *Masses* (No limit on + side)

- | | |
|--------------------------------------------|--------------|
| a) Single pipe (light series) | - 8 percent |
| b) Single pipe (medium and heavy series) | - 10 percent |

- c) For quantities per load of 10 tonnes, *Min* (light series) -- 5 percent
- d) For quantities per load of 10 tonnes, *Min* (medium and heavy series) -- 7.5 percent

NOTE — For the purpose of weighing lots of 10 tonnes or more, the material may be divided into convenient sub-lots and weighed separately. Finally the tolerance may be applied to the total weight of the lot.

10. JOINTS

10.1 All screwed tubes and sockets shall be supplied with pipe threads conforming to IS : 554-1975*. Gauging practice shall be in accordance with IS : 8999-1979†.

10.1.1 Unless specified otherwise, pipes shall be supplied screwed with taper threads and sockets with parallel threads.

10.1.1.1 However, in the case of 'light' tubes, the application of taper pipe threads may be modified by permitting the outside diameter of the pipes to be within the limits shown in col 2 and 3 of Table 1. Where the pipe approaches the lower limit of outside diameter, some incomplete threads (perfect at root and imperfect at the crest) may be expected from and beyond the gauge plane. Such incomplete threads shall not be regarded as justification for rejection of the pipes. Also the minimum length of threads in 'light' pipes shall be 80 percent of that specified in IS : 554-1975*.

10.2 Each pipe shall be supplied with one socket and one plastic protective ring. The ends of sockets shall be chamfered internally to prevent damage to the leading thread. Tapping of sockets shall be done from one end only.

11. LENGTHS

11.1 Random Length — The pipes shall be supplied in random lengths from 4 to 8 metres, unless otherwise agreed to between the manufacturer and the purchaser.

12. HYDRAULIC TEST

12.1 Each pipe shall be hydraulically tested at the manufacturer's works or as mutually agreed to between the manufacturer and the purchaser.

*Dimensions for pipe threads where pressure-tight joints are required on the threads (*second revision*).

†Gauging practice for pipe threads where pressure-tight joints are required on the threads.

12.2 Pipes shall withstand a test pressure of 5 MPa (*see Note*) without showing defects of any kind. The pressure shall be applied by approved means and maintained sufficiently long for proof and inspection. The testing apparatus shall be fitted with an accurate pressure indicator, and provision shall be made for its accuracy to be verified by the purchaser, if required.

NOTE — 1 MPa = 0.102 kgf/mm² = 10.2 kgf/cm².

13. TEST ON FINISHED PIPES AND SOCKETS

13.1 The following tests shall be conducted by the manufacturer on finished pipes and sockets.

13.2 The tensile strength of length, cut from selected pipes when tested in accordance with IS : 1894-1972* shall be at least 320 MPa (320 N/mm²).

13.2.1 The elongation percentage on a gauge length of $5.65\sqrt{S_0}$ (where S_0 is the original cross-sectional area of the test specimen) shall be not less than 12 percent.

13.3 Bend Test on Pipes — When tested in accordance with IS : 2329-1963†, the finished pipes shall be capable of withstanding the bend test without showing any signs of fracture or failure. The pipes shall be bent with the weld at 90° to the plane of bending. The pipes shall not be filled for this test.

13.3.1 Pipes shall be capable of being bent cold, without cracking, through 180° round a former having a radius at the bottom of groove, in the plane of bending, equal to six times the outside diameter of the pipe.

13.4 Expansion Test on Sockets — At the option of the manufacturer any one of the tests described in **13.4.1** and **13.4.2** shall be carried out.

13.4.1 Drift Expanding Test — It shall be carried out on sockets, blanks for sockets in accordance with IS : 2335-1963‡ on a conical mandrel having an included taper on diameter 1 in 16 and the minimum increase in outside diameter after expansion shall be 2 percent.

13.4.2 Taper Screw Plug Test — Sockets shall be capable of withstanding the expansion test as described below without showing any sign of fracture or failure.

13.4.2.1 The test shall consist of screwing the selected socket on a taper screw plug.

* Method for tensile testing of steel tube (*first revision*).

† Method for bending test on steel tubes.

‡ Method for drift expanding test on steel tubes.

13.4.2.2 The threads of the socket shall be thoroughly clean and free from foreign matter. Should the threads show sign of burr, this shall be removed by means of a pipe thread tap. The threads of the socket and the end of the test plug shall be lubricated with oil, and the socket shall then be screwed on to the test plug to the extent of extreme hand tightness by holding the head of the plug between the jaws of a vice, or other suitable fixtures, and by rotating the socket with both hands. The socket shall then be further rotated five complete turns beyond hand tightness, either by means of a pipe wrench of an adequate length to operate the test with gradual turning or by a power machine giving an appropriate leverage. The wrench shall not be hammered (*see Fig. 1*).

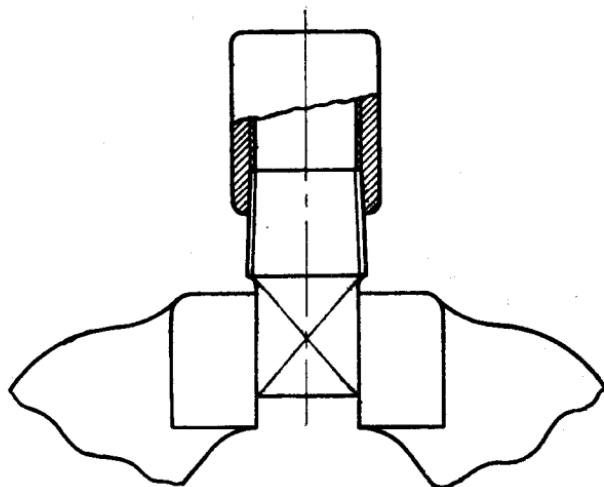


FIG. 1 MECHANICAL EXPANSION TEST ON SOCKETS

13.4.2.3 The plugs shall be manufactured from steel and shall be hardened to give a Vickers hardness between 700 and 800 HV when determined by applying a load of 30 kgf in accordance with IS : 1501-1968*.

13.4.2.4 The plugs shall be in accordance with the dimensions given in Table 5. The thread shall be ground after the plugs are case hardened, and the thread form and angle of taper shall be in accordance with the appropriate dimensions and tolerances specified in IS : 554-1975†.

*Method for Vickers hardness test for steel (*first revision*).

†Dimensions for pipe threads where pressure-tight joints are required on the threads (*second revision*).

13.4.2.5 For routine testing, use may be made, if so desired, of unhardened steel plugs in accordance with the dimensions given in Table 5 and having machined threads, the thread form and angle of taper being in accordance with the appropriate dimensions and tolerances specified in IS : 554-1975*.

13.4.2.6 In cases of dispute, however, the test shall be carried out with the hardened plugs specified in **13.4.2.3** and **13.4.2.4**.

14. WORKMANSHIP

14.1 The pipes shall be cleanly finished and reasonably free from scale. They shall be reasonably straight, free from cracks, surface flaws, laminations and other defects. The screw threads of screwed pipes and sockets shall be clean and well cut. The ends shall be cut cleanly and square with the axis of the pipe.

15. SAMPLING OF TUBES AND SOCKETS

15.1 Lot — For the purpose of drawing samples, all lancing pipes bearing the same designation and weight classification and also manufactured under a single process shall be grouped together to constitute a lot. Each lot shall be sampled separately and assessed for conformity to this specification.

15.2 Sampling and Criterion for Conformity — Unless otherwise agreed to between the manufacturer and the purchaser the procedure for sampling of pipes for various tests and criteria for conformity shall be as given in IS : 4711-1974†.

16. MARKING

16.1 Each pipe or each bundle of pipes shall carry legibly the manufacturer's name or trade-mark.

16.2 The different classes of pipes shall be distinguished by colour bands which shall be applied as follows before the pipes leave the manufacturer's works:

'Light' pipes Yellow

'Medium' pipes Blue

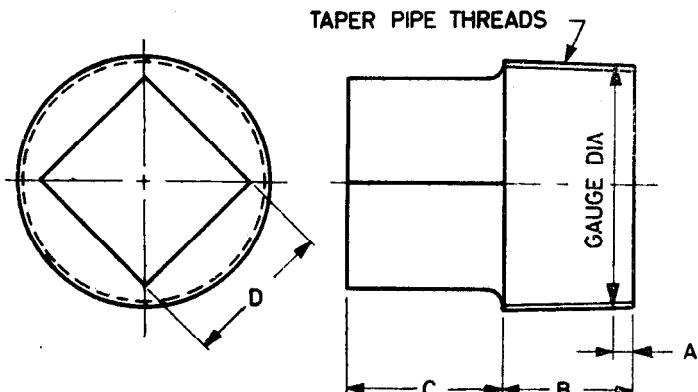
'Heavy' pipes Red

*Dimensions for pipe threads where pressure-tight joints are required on the threads (*second revision*).

†Methods for sampling of steel pipes, tubes and fittings (*first revision*).

**TABLE 5 DIMENSIONS OF TAPER SCREW PLUGS
FOR EXPANSION TEST**

(Clauses 13.4.2.4 and 13.4.2.5)



NOMINAL BORE (1)	GAUGE DIAMETER mm (2)	THREADS PER 25.4 mm (3)	TOLERANCE ON TOTAL NUMBER OF THREADS (4)	A mm (5)	B mm (6)	C mm (7)	D mm (8)
6	9.728	28	2	1.8	13	11	7
8	13.157	19	2	2.8	19	13	10
10	16.662	19	2	2.8	19	16	13
15	20.955	14	2	3.6	25	19	14
20	26.441	14	2	3.6	25	29	17
25	33.249	11	2	4.6	32	29	21

16.2.1 The pipes or each bundle of pipes may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

17. PACKING

17.1 Unless otherwise agreed to between the manufacturer and the purchaser, the pipes shall be bundled for transport and packed in accordance with IS : 4740 1979*. However, the pipes of same size and class shall be bundled together and the capped ends shall be protected by gunny cloth. Each smallest bundle shall contain preferably not more than 20 pipes.

18. COATING

18.1 The lancing pipes:

- a) shall have no internal coating,
- b) shall be free from grease and oil, and
- c) may be externally coated as specified by the purchaser.

19. ENQUIRY AND ORDER

19.1 The following information shall be furnished by the consumer while ordering the pipes:

- a) Class of pipe (*see 3.1*),
- b) Nominal bore (*see Tables 1, 2 and 3*),
- c) Length (*see 11.1*),
- d) End condition (*see 4.2*), and
- e) Packaging requirements (*see 17.1*).

*Code of practice for packaging of steel tubes (*first revision*).

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wh = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²

**AMENDMENT NO. 1 MARCH 2000
TO
IS 10577 : 1982 SPECIFICATION FOR LANCING PIPES**

(*Page 11, clause 16.2*) — Substitute the following for the existing clause:

'The different class of pipes shall be distinguished by **three closely placed colour bands** of appropriate colour as given below. The bands shall be applied before the pipes leaving the manufacturer's works:

Light Yellow

Medium Blue

Heavy Red

(MTD 19)

Reprography Unit, BIS, New Delhi, India